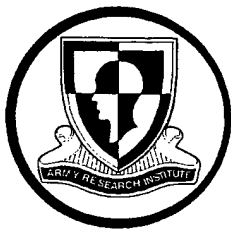


**Study
Note
2004-01**

Identifying and Assessing Interaction Knowledges, Skills, and Attributes for Objective Force Soldiers

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Human Resources Research Organization



**United States Army Research Institute
for the Behavioral and Social Sciences**

October 2003

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FOREWORD

As the Army embarks on its transformation to the future force, a variety of changes will be required to meet the needs of the Army of the future. One such need is innovation in the techniques and technologies used to assemble and assign personnel to specific assignments and teams. In response to this need, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) issued a Small Business Innovation Research (SBIR) Phase I contract entitled "Identifying the Interpersonal/Interaction (I/I) Knowledge, Skills, and Attributes for the Objective Force Soldier." The aim of the contract was to identify the specific I/I KSAs that would help the Soldiers of the future succeed in the small team-oriented environment that is part of the Army's vision for transformation and develop innovative concepts for assessing these KSAs. The Phase I research and development efforts have laid the groundwork for the development of a two-stage assessment process under a Phase II contract. The work will enable development of innovative assessments for selecting and assigning the FF Soldier in a variety of contexts.

ARI's Selection and Assignment Research Unit conducts research, studies, and analyses of individual difference measures (of aptitudes, motivations, and other attributes) related to Soldiers' job performance. The primary goal is to improve the Army's selection and classification, promotion, and reassignment of enlisted Soldiers and officers. The research presented in this report demonstrates how the Small Business Innovation Research (SBIR) Program can support these objectives.

A handwritten signature in black ink, reading "Scott E. Graham". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

SCOTT E. GRAHAM
Acting Technical Director

ACKNOWLEDGMENTS

Several people contributed to the Phase I work on Identifying the Interpersonal/Interaction Knowledge, Skills and Attributes for the Objective Force Soldier. Those not listed as authors include Dr. Tonia S. Heffner from the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) and Dr. John Campbell from the Human Resources Research Organization. Their insight and direction were invaluable to the success of the project.

Identifying and Assessing Interaction Knowledges, Skills, and Attributes for Objective Force Soldiers

EXECUTIVE SUMMARY

Research Requirement

The future force has defined the U.S. Army as it is expected to exist within the next 30 years (U.S. Army, 2001). The future force will be supported by Future Combat Systems (FCSs) that will improve the speed, maneuverability, fighting capacity, and survivability of the Army's combat operations. Transformation to the future force obviously requires tremendous advances in technology to provide the FCSs that will enable the future force. Just as importantly, however, the Army recognizes the importance of its Soldiers in accomplishing the transformation, both in terms of making the transition and working effectively within the new systems. This transition will require future force Soldiers to possess unprecedented interpersonal skills in order to achieve success in their new unit structures. The goal of this Small Business Innovation Research Program (SBIR) Phase I effort was to identify the interpersonal skills required of the future force Soldiers and identify innovative strategies for measuring those skills in future Soldiers.

Procedure

The project team conducted a literature review to identify existing Interpersonal/Interaction knowledge, skill and attribute (I/I KSA) taxonomies that would begin to identify potential interpersonal KSAs that may be applicable to the future force environment. In addition to reviewing existing taxonomies, the literature review examined papers outlining concepts for the future force and other studies aimed specifically at identifying characteristics of the future force Soldier. The results of the literature review were used as a starting point from which to develop the final taxonomy of I/I KSAs for the Phase I effort.

The project team also identified measurement approaches that could potentially be used to assess I/I KSAs. This effort included a survey of commercial and government-off-the-shelf measures of I/I KSAs to see if any existing measures would be applicable to the current effort. This review also catalogued a set of measurement techniques that could be implemented to measure the I/I KSAs. From this list of existing measures and measurement techniques we evaluated which techniques or measures could be used to provide a creative but practical assessment of the I/I KSAs.

Findings

The I/I KSA taxonomy adopted by the project team includes eleven core KSAs: (a) Relating to and Supporting Others, (b) Cultural Tolerance, (c) Conflict Management, (d) Dependability, (e) Team Orientation, (f) Adaptability/Flexibility, (g) Social Perceptiveness, (h) Communicating Orally, (i) Written Communication, (j) Leading Others, and (k) Cooperativeness in Problem Solving. To assess these KSAs, the project team developed a plan for a 2-stage assessment process. Stage 1 consists of knowledge measures of the I/I KSAs and Stage 2 requires examinees to demonstrate I/I skills in a more realistic setting. The stage 1 assessment will consist of a

situational judgment test or action exam along with an existing biographical data instrument. In the initial version of the assessment, at least one marker personality assessment will be used to help evaluate the construct validity of other measures in the assessment package. A marker test is used to compare examinees' scores on the previously validated (marker) test to scores on the experimental measure. If the experimental measure works as it is supposed to (that is, if it measures the characteristic(s) well), then people who score high (low) on the marker test should also score high (low) on the experimental measure--that is, they should score the same on both measures. Stage 2 will consist of a leaderless group discussion and a structured interview that will be video taped for later scoring by a trained assessor. The cornerstone of the 2-stage measurement approach will be the leveraging of emerging technology in computer graphics and simulation to provide the assessment materials to examinees via computer. The exams will utilize computer simulation and exercise development templates to provide stimuli to test takers and allow for easy administration, scoring, and adaptation of the exercises to a variety of environments.

Utilization of Findings

These findings will be used as a guiding strategy for developing a prototype of the 2-stage I/I KSA assessment battery under a Phase II contract.

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IDENTIFYING AND ASSESSING INTERACTION KNOWLEDGES, SKILLS AND APTITUDES FOR OBJECTIVE FORCE SOLDIERS

PHASE I FINAL REPORT

OVERVIEW

In 2003, Micro Analysis and Design (MA&D) and the Human Resources Research Organization (HumRRO) were awarded a Phase I Small Business Innovative Research (SBIR) contract entitled "Identifying the Interpersonal/Interaction knowledge, skills, and attributes (KSAs) for the Objective Force Soldier." The purpose of the Phase I project was to identify the KSAs that will be required of the future force (FF) Soldier specifically related to interpersonal interactions and to identify or develop innovative assessment concepts for measuring these skills for use in selection and assignment applications. Under the Phase I effort the MA&D and HumRRO team conducted a literature review to select a set of interpersonal/interaction skills for the FF Soldier and identified existing measures and measurement methods that could be useful in assessing these KSAs. This work is being done in preparation for Phase II, in which we will develop assessment tools that could be used for a variety of purposes (e.g., enlisted classification, training evaluation, skills certification, selection for special assignments).

The tasks completed in Phase I include:

- (1) Identify the interpersonal/interaction (I/I) skills for FF Soldiers
- (2) Research and critique interpersonal/interaction KSA measures/techniques
- (3) Develop a KSA-by-method measurement plan
- (4) Develop innovative assessment concepts

We conducted an extensive literature review to identify the I/I KSAs likely to be needed by FF Soldiers. Next we developed a list of possible assessment measures and techniques. This list included many commercial off-the-shelf (COTS) assessments as well as techniques such as situational judgment tests and leaderless group discussions. We then created a KSA-by-method matrix and used it to identify which measures seemed to be appropriate measures for each KSA. Finally, we discussed how to adapt current MA&D technology and products to use them in innovative ways to measure the I/I KSAs.

The remainder of this report will document the findings of the Phase I effort, describe the proposed design of the assessment battery, describe the final assessment concepts chosen to assess the interpersonal/interaction (I/I) KSAs, and provide a brief overview of the tasks to be performed in the Phase II effort.

Identifying the Interpersonal/Interaction knowledge, skills, and attributes (KSAs) for the Objective Force Soldier

Over the last several years, the U.S. Army Research Institute for the Behavioral Sciences (ARI) has undertaken several studies to identify the KSAs needed by Soldiers in the FF. The NCO21 project (Ford, R. Campbell, J. P. Campbell, Knapp, & Walker, 2000; Knapp et al., 2002) identified measurement methods to assess a broad range of KSAs across two eras (2000-2010 and 2010-2025). The Select21 project (Sager & Russell, 2003) is developing a set of measures to supplement the existing Armed Services Vocational Aptitude Battery (ASVAB) subtests in selecting and classifying entry-level Soldiers. The Select21 research provided a starting point for identifying the KSAs relevant to this project. The current work differs from those studies by focusing specifically on the KSAs required for effective interpersonal interactions. Although the prior ARI research included some interpersonal KSAs (e.g., Teamwork Orientation, Social Perceptiveness), we thought a targeted investigation of I/I KSAs might be desirable under this effort. So we supplemented the military research with academic research literature that addressed I/I KSAs. The research, summarized on the following pages, has been organized according to four major themes, which seemed to encompass the major dimensions of interest:

- Building and maintaining relationships
- Teamwork
- Team Leadership
- Communication

Building and Maintaining Relationships

In any working environment, it is useful to be able to get along well with others. This ability could be even more important in the Army, where one not only works with the same people every day, but also eats and sleeps with them. This section of the report describes the literature related to the KSAs we associated with Building and Maintaining Relationships. These included relating to and supporting others, agreeableness, concern for Soldier quality of life, cultural tolerance, and conflict management.

A number of research efforts have described a trait referred to as interpersonal competence or general interpersonal skills (Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Ford et al., 2000; Knapp et al., 2002; Medsker & Campion, 1997; Sager & Russell, 2003). Medsker and Campion define interpersonal competence as the “ability to maintain healthy working relationships and respond to others with respect for their point of view” (p. 475). Ford et al. termed a similar KSA “Relating to and supporting others.” They defined the construct as “treats others in a courteous, diplomatic, and tactful manner. Provides help and assistance to others. Works effectively as a team member” (p. 33).

Agreeableness is one of the “Big Five” personality factors assessed in the NEO-PI (Costa & McCrae, 1992). According to Costa and McCrae, agreeableness is a trait in which it is desirable to strike a balance between too much and too little. Highly agreeable people may be too willing to give in to others to avoid conflict, while those who are low in agreeableness may come across as rude or abrupt, stubborn, or tough-minded. To clarify the desirable aspects of the characteristic, Project A (Hough, Barge, & Kamp, 2001) defined agreeableness as “The degree of pleasantness

versus unpleasantness exhibited in interpersonal relations. Is tactful, helpful, and not defensive, versus touchy, defensive, alienated, and generally contrary” (p. 121); Sager and Russell (2003) adopted that definition in the Select21 project.

Knapp et al. (2002) identified a third KSA related to interpersonal skills – concern for Soldiers’ quality of life. The population of interest in that investigation was Army non-commissioned officers (NCOs), so this KSA was quite appropriate. This KSA was defined as “Is aware of subordinates’ off-duty needs and constraints. Is sensitive to others’ priorities, interests, and values, and tries to assist subordinates in making their personal and family life better” (p. 6). One of the goals of Phase I of this SBIR was to identify I/I KSAs for Soldiers in a range of pay grades, which will include NCOs and lower pay grades. It is reasonable to expect that Soldiers with strong interpersonal skills would also be concerned for the quality of life experienced by their colleagues, even though that concern might be more circumscribed than it is for NCOs.

Ford et al. (2000) concluded that military operations are likely to become more frequent in the FF. U.S. forces are also likely to respond to ongoing terrorist attacks, as has happened in Afghanistan and Iraq. In addition, while on these deployments, Soldiers are likely to be part of coalition forces that include Soldiers from other countries. These types of deployments will require that Soldiers remain in foreign countries or in contact with Soldiers from other nations for relatively long periods of time. To be most effective in their role, it will be important that they understand and respect the customs and mores of the country where they are stationed. Klein, Pongonis, and Klein (2000) discuss national cultural differences and the KSAs needed by Soldiers to work in a multi-cultural environment. They conclude that the ability to work with team members from different cultures involves more than simply accepting that there are cultural differences. In their view, multicultural team members are successful to the extent that they attempt to understand different ways of thinking and approaching problem solving – to see through another person’s “cultural lens” (p. 1).

In addition to deployments to other countries, Soldiers will increasingly find the demographic composition of the Army becoming more diversified. In the 20th century, a new Soldier might find him/herself in a squad with Soldiers from across the U.S., from varying socioeconomic backgrounds and ethnicities. Fueled by Soldiers from immigrant families and Soldiers who are not yet American citizens, the face of the Army will continue to change. Thus, it is increasingly important that Soldiers accept and are tolerant of, if not embracing, the diversity of those with whom they work daily. The definition of cultural tolerance used by Ford et al. (2000), Knapp et al. (2002), and Sager and Russell (2003) emphasizes the need to be tolerant and understanding of those from other cultures and social backgrounds during interactions with Army personnel and foreign nationals.

It is inevitable that any group that works together will experience some kind of conflict. Stevens and Campion (1994) claimed that conflict was not only inevitable, but also necessary for a team to “sense the need for change or draw attention to problem areas” (p. 507). The hallmark of effective teamwork is being able to resolve conflicts without allowing it to hurt performance. Medsker and Campion (1997) recognized the importance of conflict resolution skills. Their definition included (a) the ability to recognize and encourage desirable team conflict but discourage undesirable team conflict, (b) the ability to recognize the type and source of conflict

confronting the team and to implement an appropriate resolution strategy, and (c) the ability to employ a win-win negotiation strategy rather than a win-lose strategy.

Researchers have identified two general types of conflict management processes (Marks, Mathieu & Zaccaro, 2001; Tjosvold, 1985). A preemptive process requires team members to prevent and control conflict before it occurs. For example, team members can set a team norm that encourages the use of a cooperative approach rather than competitive approach to conflict resolution (Tjosvold, 1985). Team members can also clarify some rules a priori about how they should handle conflict situations. In a reactive process, team members deal in a constructive way with conflict that has occurred. Negotiation, compromising, and willingness to accept different opinions are some often used strategies for reactive conflict management (Marks et al., 2001)

Teamwork

Although the Army advertises itself as "An Army of One," that slogan refers to the fact that the Army considers all Soldiers to be members of the same team. That feeling is inculcated into Soldiers during Basic Combat Training and reinforced at all levels. Teamwork has long been a hallmark of the Army. The FF literature (U.S. Army, 2002) indicates that this team orientation will continue to be a strong force for Soldiers in the future. Soldiers will need to be able to depend on their buddies during stressful campaigns for both physical and emotional support.

Cannon-Bowers et al. (1995) identified team competencies that include a number of KSAs recognized as team membership skills, such as interpersonal cooperation, morale building, intermember assistance, and intrateam reinforcement. They also identified collective orientation (belief in placing team goals above individual goals) and belief in the importance of teamwork as critical to working effectively in teams. Along the same lines, Knapp et al. (2002) identified selfless service orientation and fostering adaptive teamwork as skills that support effective teamwork; and Sager and Russell (2003) included teamwork orientation among the KSAs for entry-level Soldiers.

Rasker (2002) reviewed the teamwork literature through 2001 and described the teamwork KSAs that have been enumerated in a number of publications. In his summary, he identified four critical behaviors associated with team performance: monitoring team performance, giving intra-team feedback, communicating, and providing backup. He identified team orientation, team identity, and collective behavior as important KSAs in team performance.

Giving and receiving feedback is one major mechanism that links team members' task activities together (Cannon-Bowers et al., 1995; Marks, Mathieu, & Zaccaro, 2001). By actively seeking and providing feedback, a team member knows what activities other members are conducting, how much progress they have made, if they have problems or need help, and if he/she needs to adjust his/her work pace to coordinate with other team members.

Among Medsker and Campion's (1997) teamwork clusters is collaborative problem solving, which includes (a) being able to identify when group problem solving is appropriate and using the technique appropriately and (b) recognizing the obstacles to collaborative problem solving and removing them.

Team Leadership

Any team, whether by design or accident, might find itself in a situation that requires a large degree of self-management (Cannon-Bowers et al., 1995; Hackman, 1986). Thus, it is important for both team members and team leaders to exercise leadership such as planning and organizing tasks, assigning tasks among team members, acting as a role model, and giving directions and suggestions to other members (Goodman, Devadas, & Hughson, 1988; Stevens & Campion, 1994). Team leadership includes the direction and structure provided by formal leaders as well as by other team members (Larson & LaFasto, 1989). Most existing team or teamwork models (e.g., McIntyre & Dickinson, 1992; Militello, Kyne, Klein, Getchell, & Thordsen, 1999; Nieva Fleishman, & Rieck, 1978; Stevens & Campion, 1994) include team management or team leadership as an important component of teamwork. Rasker (2002) identified several dimensions that are related to performance, including the ability to monitor and give feedback, and leadership and team management skills. Taking responsibility for giving and receiving feedback is related to the team leadership KSA identified by Knapp et al. (2002) as being important for NCOs. However, it is not necessary to be a supervisor to use or develop leadership skills. The Army is also eager to identify and reinforce leadership potential (U.S. Army, 2002), which makes characteristics such as acting as a role model and willingness to help others important characteristics of all FF Soldiers.

Teams, particularly in the Army, must often work in rapidly changing and uncertain environments. This requires that team members be able to adjust themselves to different roles, learn new ways to perform their jobs, and learn quickly how to cooperate with others (Black, 1990; Noe & Ford, 1992). Therefore, adaptability is often considered as one important component of teamwork (Cannon-Bowers et al., 1995; Eby, Meade, Parisi, & Douthitt, 1999; Morgan, Glickman, Woodard, Blaiwes, & Salas, 1986; Sundstrom, de Meuse, & Futrell, 1990). Pulakos, Arad, Donovan, and Plamondon (2000) developed a conceptual model that described four generic dimensions of adaptability: (a) solving problems creatively, (b) learning new work tasks, technologies and procedures actively, (c) adjusting interpersonal styles and behaviors to work with new coworkers flexibly to achieve goals, and (d) performing effectively in different cultural and physical environments.

Social Perceptiveness

Kihlstrom and Cantor (2000) define social intelligence as the ability to understand people and to act effectively in human relations. They propose five dimensions to describe Social Intelligence: (a) interest and concern for other people, (b) social performance ability, (c) empathic ability, (d) emotional expressiveness and sensitivity to others' emotional expressions, and (e) social anxiety and lack of social self-efficacy. Social intelligence comprises the ability to be aware of one's own and others' emotions and to use that awareness to guide thinking and actions. This KSA is also referred to as social perceptiveness (Knapp et al., 2002; Sager & Russell, 2003). Interpersonal intelligence is defined as the ability to understand other people: what motivates them, how they work, and how to work cooperatively with them (Young, 1996).

Communication

Skills related to this dimension identified in the NCO21 research effort by Ford et al. (2000) are principally focused on effectively communicating to subordinates: (a) directing, monitoring, and supervising subordinates, (b) motivating, leading, and supporting individual subordinates, and (c) training others. Knapp et al. (2002) identified the following three KSA areas that include communication: (a) oral communication, (b) writing skill, and (c) training others. Medsker and Campion (1997) found communication skills to be predictive of teamwork performance ratings. In their view, communication skills include the ability to (a) communicate openly and supportively, (b) listen non-evaluatively and use active listening techniques when appropriate, (c) coordinate verbal and nonverbal messages to use them most effectively, and (d) engage in small talk and ritual greetings, recognizing their importance. Rasker's (2002) review of the team performance literature also identified communicating as one of the critical behaviors associated with team performance ratings.

Although letter writing is on the wane, written communication is not losing its importance. People increasingly communicate electronically via email or instant messages. Although these media offer ample opportunity to communicate, they also present the problem of conveying information with little context to help interpret the meaning of a message. Thus, it is more of a challenge to convey the spirit of the communication in fewer words.

The list of nineteen I/I KSAs developed as a result of the literature review is shown in Table 1.

Determination of Interaction/Interpersonal KSAs for the FF Soldier

The literature provided us with many variations on some common themes, so the task fell to us to sort and combine them into meaningful KSAs. In some cases, traits or capabilities that were labeled differently appeared to describe the same construct (e.g., multi-cultural teamwork & cultural tolerance, intermember assistance and team orientation), so these traits were aggregated into a single dimension. In other instances, KSAs seemed logically related to each other but distinct enough to stand on their own or, as mentioned previously, it made sense to break a complex KSA such as oral communication into some of its component parts (e.g., active listening and nonverbal skills) to emphasize their importance as I/I skills.

However, as the team began to work with the KSAs and think about how they could be assessed, we identified two potential problems with trying to measure each of them individually. First, there is a significant degree of overlap between some of the KSAs (e.g., "Relate to and support peers" with "Amicability"). Second, not all of the KSAs have sufficient research behind them to support development of measures (e.g., active listening). So, we re-categorized the KSAs into what we refer to as the Core I/I KSAs. Some of the KSAs stand on their own while others are subsumed under a broader rubric. The KSAs have been reorganized as shown in Table 2.

Table 1. Interpersonal/Interaction KSAs Identified in the Literature Review

Ability to Relate to and Support Peers. The degree to which the individual treats peers in a courteous, respectful, and tactful manner. Provides help and assistance to others. Backs up and fills in for others when needed. Works effectively as a team member.

Amicability. The degree of pleasantness versus unpleasantness exhibited in interpersonal relations. Exhibits goodwill towards others and an absence of antagonism. Is tactful and helpful rather than defensive, touchy, and generally contrary.

Concern for Soldier Quality of Life. Is sensitive to others' priorities, interests, and values, and tries to assist them in making their personal and family life better.

Conflict Management. The degree to which the individual encourages and supports different perspectives, avoids harmful conflict, constructively addresses disagreements that undermine team performance, and does not allow conflicts with others in ways that preserve good relations and enhance trust.

Cultural Tolerance. The degree to which an individual demonstrates tolerance and understanding of individuals from other cultural and social backgrounds, both in the context of the diversity of U.S. Army personnel and interactions with foreign nationals during deployments or when training for deployment.

Dependability. The person's characteristic degree of conscientiousness. Is disciplined, well organized, planful, and respectful of laws and regulations.

Team Orientation. The degree to which an individual identifies with the team and other team members and works to boost team morale and increase the team bond by creating and maintaining a supportive work environment; willingness to put the needs of the team ahead of personal needs.

Affiliation. The degree of sociability that one exhibits. Is outgoing, participative, and friendly versus shy and reserved.

Coordination. The ability to work interdependently to reach task completion, share information and effort, and work together with others. Can adjust own time and work activities to ensure interdependent tasks are completed effectively.

Cooperativeness in Problem-Solving. The ability to take advantage of multiple perspectives to find effective solutions to problems.

Adaptability/Flexibility. The degree to which an individual is able to respond to rapidly changing situations (e.g., assignments, relocation, new Soldiers) and accept new roles.

Social Perceptiveness. The degree to which an individual is able to monitor own and other's emotions, discriminate among them, and use the information to guide one's thinking and actions, allowing one to work cooperatively with others. Is aware of how own behavior impacts others.

Oral Communication Skills. The ability to speak clearly and precisely so that others can easily understand. The ability to adapt speaking style and comments to the audience, as appropriate.

Active Listening. The ability to listen non-evaluatively to instructions and related messages, focusing on the person communicating. Asks and responds to questions as appropriate. Pays attention to nonverbal cues to help clarify/interpret messages.

Nonverbal Skills. The ability to match verbal and nonverbal messages when speaking to clarify and enhance the message. The degree to which an individual can accurately interpret the nonverbal signals of others.

Written Communication. The ability to write clearly so that message is understood by the reader. Is sensitive to the limitations of written communication (e.g., email) and carefully phrases message so that the intent can be clearly understood by the receiver.

Acts as a Role Model. Exhibits self-confidence and a positive attitude. Presents a positive and professional image of self and the Army even when off duty.

Helping Others. The ability to help other team members to improve performance. Willingness to provide assistance as needed and to guide and tutor others on technical matters.

Task Leadership. Ability to help keep the team focused on the team's assignment or mission, working with team members to react to changes and to ensure that conflicts do not hinder mission achievement.

Table 2. Core Interpersonal/Interaction KSAs

-
- I. Relating to and supporting others
 - A. Ability to relate to and support peers
 - B. Amicability
 - C. Concern for Soldiers' quality of life
 - II. Conflict management
 - III. Cultural tolerance
 - IV. Dependability
 - V. Teamwork
 - A. Team orientation
 - B. Affiliation
 - C. Coordination
 - D. Cooperativeness in problem-solving
 - VI. Adaptability/Flexibility
 - VII. Social Perceptiveness
 - VIII. Communication ability
 - A. Oral communication
 - B. Active listening
 - C. Nonverbal communication skills
 - D. Written communication
 - IX. Peer Leadership
 - A. Acts as a role model
 - B. Helping others
 - C. Task leadership
-

Research And Critique Interpersonal/Interaction KSA Measures/Techniques

Identify Assessment Measures or Techniques

The second task of the Phase I effort was to identify assessment techniques by which to evaluate individuals on the core I/I KSAs. We developed a list of assessment methods (see Table 3) and identified measures that could be included in those categories. These included COTS instruments (e.g., NEO-PI, 16PF) and measures designed for previous ARI projects (i.e., NCO21 and Select21), as well as measures such as computerized simulations and role plays that could be developed in Phase II.

We collected information related to the measures and measurement methods through related documentation (e.g., technical manuals, research reports). In addition, information in the research literature and the experience of the project staff were used to identify and evaluate potential measurement methods.

One factor to bear in mind is that research has shown that some of the KSAs we plan to measure are susceptible to response distortion. That is, individuals who are motivated to present a false

impression of themselves are able to do so. For that reason, we favored strategies that have been shown to be helpful in reducing response distortion. It will also be necessary to evaluate the potential for response distortion on the measures that are subsequently developed or used in future phases of this work.

Table 3. Possible Assessment Methods

Text-based
Self-report (fixed response)
Self-report (free response)
Forced-choice
Scenario-based (fixed response)
Oral interviews
Situational, behavior description, combination or other structured
Behavior descriptions
Combination or other structured format
Clinical
Simulations (computer based)
High fidelity stimulus and response
High fidelity stimulus and low fidelity response
Low fidelity stimulus and high fidelity response
Low fidelity stimulus and response
Live action
Individual
Group simulations
Role play
Real life behavior
Performance ratings
Work product review

Develop a KSA-by-Method Measurement Plan

To facilitate selection of the best methods for assessing the I/I KSAs identified in the Phase I effort, we developed a KSA-by-Method matrix. In the original matrix, the KSAs were listed in the left column and all the potential measure types were listed across the top. While this was an efficient way to set up the matrix for populating it, it ended up with more empty cells than populated cells. Therefore, we captured that information and put it in a more readable format, presented in Appendix A.

When that task was completed, the next step was to assess the feasibility of using each type of test or technique to assess each of the I/I KSAs. Each measurement method was rated on three criteria to determine which method would be most appropriate for measuring which KSA. The criteria used in evaluating the measurement methods were as follows:

- *Appropriateness of Method (AoM)*: Whether the method is appropriate for use for the given KSA, to what degree that method can be used to tap the KSA. It is scored as: 0 – Not Appropriate; 1 – Possibly Appropriate, 2 – Appropriate

- *Susceptibility to Faking (F)*: The degree to which the method can be easily faked. It is scored on a scale of 1 to 5 with 1 indicating highly susceptible to faking and 5 being not susceptible to faking.
- *Ease of Implementation (EoI)*: The degree of difficulty associated with actually using the method to gauge the KSA. It is scored on scale of 1 to 5 with 1 indicating highly difficult to implement (high cost, labor intensive, etc) and 5 indicating low difficulty in implementation.

We populated the KSA-by-Method matrix with those ratings. Again, the matrix is too unwieldy to show in its entirety, but Figure 1 shows a partial depiction. To help identify the final assessment methods, we also created a single “Utility to the Army” (UA) index that collapses information from the ratings listed above. It provides a score that can be used to rank order available measurement techniques.

UA scores can range from 0 to 20, with higher UA scores indicating more utility to the Army. The ideal score (20) would be reached by a measurement technique that is very appropriate for the KSA, very easy to implement (develop, administer, and interpret), and highly resistant to faking. It seems unlikely that any measurement technique would reach that score as more appropriate measures may generally be more “fakeable,” and many appropriate measures, such as group role plays, appear generally to be more difficult to implement and/or score. For more detailed information on UA calculations see Appendix B.

The most important criterion for a test is how well it measures the KSA of interest, which we are calling appropriateness. A test that has an appropriateness score of 1 may have a UA that is equal to or higher than a test with an appropriateness score of 2, if it is more resistant to faking and easier to develop and administer. This tradeoff is important to consider because the most valid tests are frequently either more fakeable or more difficult to develop and implement. Table 4 presents the top three highest UA measurement methods for each of the I/I KSAs. The KSAs presented in bold type are the core KSAs. Appendix B contains the written summary of the exercise, describing the rationale behind each rating.

The KSA-by-method matrix and associated ratings were used as supporting aids in a project team meeting to develop an I/I KSA measurement plan. In this brainstorming meeting, participants nominated various measurement methods for inclusion in an experimental assessment battery.

There are many existing COTS products that are often used to assess I/I KSAs. Meeting participants agreed to exclude most COTS measures because of cost considerations and difficulty and time delay associated with scoring these assessments. We believe that we can develop new measures or adapt existing measures for this project that will serve our needs without the constraints involved with COTS assessments.

Although there are a variety of contexts in which these measures might be used, we assumed that one-on-one assessment procedures would not be practical and that field personnel should not be expected to learn and use complicated scoring procedures. We favored measurement methods

that would complement each other and, in combination, would represent technical and technological innovations in assessment.

Table 4. Summary of Measurement Methods with Greatest Utility to the Army

KSA	Highest UA Method	2nd Highest UA Method	3rd Highest UA Method
Relating to and Supporting Others			
Relate to and Support Peers	Real life behavior (9-18)	Live Action (10-12)	Simulation (10-12)
Amicability	Live Action (10)	Simulation (8-10)	
Concern for Soldier Quality of Life	Live Action (10-12)	Self-report (6-8)	Real life behavior (7)
Conflict Management	Simulation (10-12)	Live Action (8-12)	Real life behavior (7-8)
Cultural Tolerance	Interviews (8-12)	Live action (8)	Real life behavior (7-8)
Dependability	Real life behavior (16)	Interviews (5)	Live action (4-5)
Team Orientation			
Team Orientation	Interviews (10-12)	Live action (10)	Self-report (7-10)
Affiliation	Live Action (10-12)	Simulation (10-12)	Real life behavior (8)
Coordination	Live action (10-14)	Simulation (10-12)	Real life behavior (7-8)
Social Perceptiveness	Simulation (10-12)	Live action (8-12)	Interviews (6-7)
Adaptability/Flexibility	Self-report (5-14)	Live Action (10-12)	Interviews (10)
Communicate Orally			
Active Listening	Live action (12-16)	Interviews (12-14)	Simulation (8)
Non-verbal skills	Interviews (16)	Live action (12-14)	
Oral Communication skills	Interviews (16)	Live action (16)	Real life behavior (0-8)
Written communication skills	Real life behavior (8-10)		
Leading Others			
Acts as a role model	Real life behavior (6-16)	Live Action (12)	Interviews (6)
Helping others	Simulation (8-10)	Live action (6-10)	Self-report (4-7)
Task leadership	Live action (14-16)	Real life behavior (7)	Simulation & Self-report (5-6)
Cooperativeness in problem solving	Live action (8-10)	Real life behavior (7-8)	Interviews (4)

The brainstorming meeting resulted in a roughed-out concept of a 2-stage assessment process with multiple measures at each stage. Following the meeting, a more detailed measurement plan was devised.

Method		SELF REPORT				Interviews		Simulation	
		Fixed Response	Free Response	Forced Choice	Scenario Based Fixed Response	Structured Interview	Clinical	High Fidelity Stimulus & Response	High Fidel Stimulus - I Fid. Respo
KSA									
Ability to Support Peers	AoM	1	1	1	1	1	1	2	2
	F	3	4	2	3	4	2	2	2
	EoI	3	2	3	3	2	4	5	5
Affiliation	AoM	1	1	1	1	1	1	1	1
	F	3	4	2	4	3	3	3	3
	EoI	3	1	3	3	4	4	5	5
Agreeableness	AoM	1	1	1	1	1	0	2	2
	F	3	3	2	4	4	1	3	4
	EoI	3	2	3	4	4	3	5	5
Concern for Soldier Quality of Life	AoM	1	1	1	1	1	0	2	2
	F	3	4	2	4	4	3	4	4
	EoI	3	2	3	4	3	3	5	5
Conflict Management	AoM	1	1	1	1	1	1	2	2
	F	3	4	2	3	4	4	4	4
	EoI	3	2	3	4	4	4	5	5
Cultural Tolerance	AoM	1	1	1	2	2	2	2	2
	F	3	5	1	4	4	3	4	4
	EoI	3	2	3	4	4	3	5	5
Dependability	AoM	0	0	0	0	1	1	0	0
	F	5	5	1	5	4			
	EoI	5	2	5	4	3			
Team Orientation	AoM	1	1	1	2	2			
	F	3	4	2	4	4			
	EoI	3	2	3	3	3			

Legend:
AoM – Appropriateness of Measure
F – Fakability
EoI – Ease of Implementation

Figure 1. Example of KSA-by-method matrix populated with ratings on the utility criteria.

Develop Innovative Assessment Concepts

The next task was to complete a draft design of the I/I KSA assessment battery. This battery includes a combination of simulations and self-report measures, a work sample, and a live action assessment. We think the measures in this set complement each other well, assess the constructs of interest, and will be reasonably easy to implement with the technology available to us. The proposed 2-stage assessment process is illustrated in Figure 2. Stage 1 will focus on whether an examinee has the knowledge of what should be done when interacting with others; Stage 2 will assess whether the examinee can demonstrate skill. For example, a person may know that it is inappropriate to interrupt a speaker before she is finished, but may still do so when interacting with others.

In this section, we describe in more detail the types of assessments we plan to use. Particularly given the experimental nature of some of these ideas, a detailed measurement plan will evolve as we begin prototyping the measures.

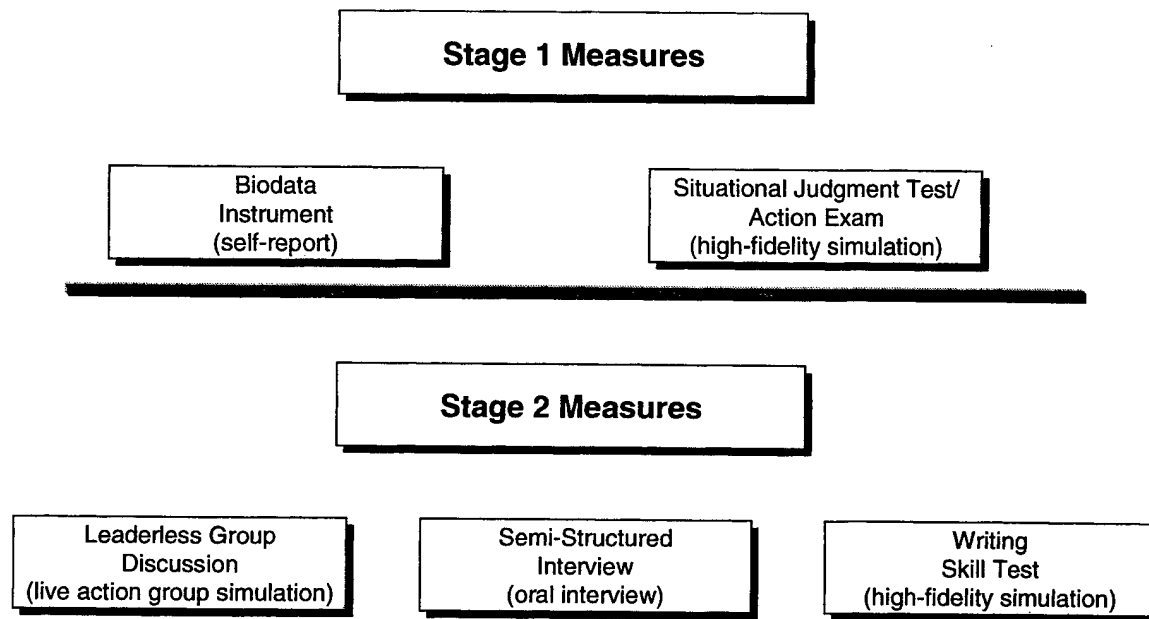


Figure 2. The proposed Phase II assessment battery.

The Proposed Assessment Battery

Stage 1 Measures

In Stage 1, we propose to adapt an existing biodata instrument for our use, and develop either a situational judgment test (SJT) or an action exam. The SJT and action exam can both be designed to assess the same KSAs. The SJT is a commonly used instrument that has a good body of research behind it, and we have solid experience in developing this type of test. While it has traditionally been a paper-and-pencil test, it can easily be adapted to a computer simulation. The action exam, on the other hand, is a fairly innovative assessment. It is a student evaluation technique that was developed by instructors to determine whether students were able to apply the “book learning” from class to a role play or videotaped scenario (Keleman, Garcia, & Lovelace, 1990).

Biodata Measure

A biodata inventory is a self-report instrument that contains questions that are relatively objective and readily verifiable, such as the amount and nature of education, job experiences, special skills, hobbies, and recreational activities. It is not unusual for a biodata inventory to be used to obtain some of the same types of information under uniform conditions and in situations where it would not be feasible to conduct individual interviews. The rationale behind the use of biodata is that the activities, interests, and behaviors one has exhibited in the past are predictive of what one will do in the future (Owens, 1976).

Biodata inventories are appealing in testing situations because previous research has indicated that they tend to have very low adverse impact when items are screened in advance (Mumford & Stokes, 1992). Furthermore, because biodata forms measure characteristics not captured by standard ability tests, they tend to provide incremental validity over that obtained with cognitive

measures (Hunter & Hunter, 1984; Mitchell, 1994). Biodata measures have been found to be consistently good predictors of a variety of performance measures for many different jobs (e.g., Kilcullen, White, Zacarro, & Parker, 2000; Owens, 1976). The validity of biographical information or data (or biodata) has been demonstrated in several previous studies (Hunter & Hunter, 1984; White & Young, 1998; Young, Heggstad, Rumsey, & White, 2000). Previous research has also shown that biodata scales can be used to measure personality constructs, have higher criterion-related validity, and are less easily faked than traditional self-report personality assessments (Kilcullen, White, Mumford, & Mack, 1995). In comparison to alternative measures, biodata forms are feasible for group administration and scoring at a lower cost and are generally accepted by employers and the courts.

Recent emphases in biodata research have been on the understanding of the constructs underlying biodata measures (Mitchell, 1994; Stokes, 2001). Instead of empirically determining which sets of biodata items might distinguish between job incumbents who perform well and those who do not perform well, the goal is to write items targeted to specific KSAs required for successful job performance. Biodata items have two essential characteristics: (a) people are asked to recall and report behavior and experiences, and (b) items refer to behavior and experiences occurring in specific situations to which individuals are likely to have been exposed. For example, if the KSA required is achievement motivation, a biodata item might consist of the question, "How important was it for you to get A's in school?" A question for the same domain but tailored to an adult might be "How important has it been to you to receive excellent performance evaluations on your job?"

Biodata items reflect various situational and behavioral scenarios including situational exposure, situational choice, behavior in a situation, reactions to situations, others' reactions to a situation, and outcomes associated with personal exposure. Items can be either direct (e.g., What was the average grade you received on writing assignments during college?) or indirect (e.g., How many books were around your home when you were growing up?). Biodata items must take into account the historic condition, social expectation, and age of the population. Multiple items are written for each KSA or construct of interest; it is through the use of multiple items that a meaningful pattern emerges.

While we think that a biodata instrument will provide valuable information, we do not plan to develop the instrument from scratch. A traditional, empirically-based instrument is too expensive to develop and likely to lose predictive validity over time. In addition, rationally-based biodata instruments tend to work better in our experience. Therefore, we propose to use the instrument currently under review and development in Select21. This instrument, tentatively named the TAP/BIQ Amalgam (TBA) is composed of selected scales from the Test of Adaptable Personality (TAP) and the NCO21 Biographical Information Questionnaire (BIQ) (Knapp et al., 2002).

The TAP is a 20-minute biodata assessment that has demonstrated criterion-related validity in operational use for Special Forces Soldiers. As work on the instrument for Select21 progressed, the project staff decided to use only some of the TAP scales and supplement them with scales from the BIQ, which is a conglomerate biodata instrument administered during the NCO21 project (cf. Putka, Kilcullen, & White, 2003) and comprising ARI's Assessment of Right Conduct. KSAs that could be measured with the TBA include:

- Adaptability/Flexibility
- Cultural Tolerance
- Dependability
- Social Perceptiveness
- Team Orientation

Situational Judgment Test (SJT)

SJTs, which have been in use for decades, contain a series of job situations or problems typically presented in writing (Motowidlo, Dunnette, & Carter, 1990). There are two parts to an SJT item. The scenario, or stem of the question, describes the situation and provides a problem that requires a decision to be made. The response options provide realistic actions for handling the problem situation. Unlike typical multiple-choice tests, there is not one correct answer and several wrong answers. Rather, each option is a plausible way of handling the situation, with some options being better than others.

Well-written situations are actual events that one could encounter on a job. They are relatively brief (two to four sentences) that require a decision on the part of the respondent, although the best answer should not be obvious. The situation should not be one that requires training to recognize the best answer. Each situation should relate to one of the competencies that the SJT is intended to measure.

SJTs have been used to assess an array of constructs, including conflict resolution (Dragow, Olson-Buchanan, & Moberg, 1999), managerial skills (Motowidlo, Hanson, & Crafts, 1997; Waugh, 2002; Waugh & Sticha, 2001), and technical skills (Hanson, Borman, Mogilka, Manning, & Hedge, 1999). An example of a situational item adapted from a paper by Waugh, Putka, and Sager (2002) is presented in Figure 3.

One of your fellow employees feels like he doesn't have to pitch in and do the work that you were all told to do. What should you do?
<ol style="list-style-type: none"> 1. Explain to the individual that he is part of a team and needs to pull his weight. 2. Report him to your supervisor. 3. Find out why he feels he doesn't need to pitch in. 4. Keep out of it; this is something for your boss to notice and correct.

* adapted from Waugh et al., 2002

Figure 3. Example situational judgment item.

SJTs have become very popular assessment instruments for several reasons. First, they assess knowledge and skills that cannot be addressed with traditional multiple-choice test formats and yield reasonably high estimated validities for predicting job performance. McDaniel, Bruhn-Finnegan, Morgeson, Campion, and Braverman (1997) conducted a meta-analysis that found the validity of SJTs (corrected for restriction of range and criterion unreliability) was .56. Second, this type of test is relatively easy and inexpensive to score. A third advantage is that differences

in mean scores between racial subgroups are typically smaller than that found with cognitive ability tests. Motowidlo et al. (1990) reported standardized mean differences between African-Americans and Caucasians of .14 and .29. Schmitt et al. (1994) found moderate mean differences (.41) between African-Americans and Caucasians, no differences between Caucasians and Hispanics, and a small mean difference between males and females. Fourth, examinees perceive SJTs to be face valid (Motowidlo et al., 1990) and appropriate as a job-relevant assessment. Face validity has been shown to produce positive examinee reactions (Bauer, Maertz, Dolin, & Campion, 1998; Ployhart & Ryan, 1998). The perception of face validity and positive examinee reactions appear to play a role in test taking motivation and the magnitude of subgroup differences (Chan, Schmitt, DeShon, Clause, & Delbridge, 1997).

We believe that the situational judgment test is a good alternative, because once scoring keys are developed, SJTs are easily administered and machine scored. They are also easily adapted to automation. This type of instrument can measure important KSAs that will help to ensure that examinees are properly screened for the Stage 2 assessments.

Action Exam

In their early work with action exams, Keleman and his colleagues (Bigelow, 1991; Keleman, et al., 1990; Keleman, Lovelace, & Garcia, 1991) used role plays to evaluate their students' ability to convert cognitive learning to an interpersonal interaction. They were concerned when students who had done well in the classroom had difficulty acting in new interaction situations. They concluded that classroom presentations and textbooks present problems in neat packages for which there is clearly an answer. Real world interactions are often ill-defined and complex, however, leaving the problem solver to define the problem and come up with a solution. Because interpersonal interactions are a large part of problem solving, these researchers developed a system that would allow them to assess how well their students could perform in such situations and also provide focused feedback to the student.

Typically, they presented the student with a situation (e.g., the student is a supervisor in a service organization and has just seen a subordinate respond to a group of customers in a way that made them angry; the instructor is the subordinate who has an explanation) and then set the stage for a discussion between the two parties. The instructor then rated the effectiveness with which the student demonstrated skill in managing "Interaction Flow," "Interaction Outcomes," and "Communication."

Interaction Flow includes such things as opening the discussion, discussing needs of both parties, and mutually developing a solution. Interaction Outcomes focus on whether the solution took common interests into account, whether the outcome is tied to objective criteria, and whether it will maintain or improve the relationship. The rating for Communication includes effective use of nonverbal behavior, being problem focused, active listening, style flexibility, and maintaining composure (Keleman et al., 1990).

If we decide to include an action exam in the test battery, we would quite likely take a different approach. The Stage 1 assessments will need to be efficient to administer and should be capable of being administered via computer. The Keleman et al. (1990; 1991) approach does not have those characteristics. In addition, that approach is designed to determine whether someone can

apply knowledge in a role play; our focus for Stage 1 is finding out whether the Soldier has the underlying knowledge that *could* allow him or her to demonstrate the skill.

It is likely that in our assessment, we would present an examinee with a computer-animated situation to which the examinee would be asked to make an open-ended response. For example, the examinee could be asked to identify the salient facets of the situation (e.g., tension, status differences between actors), or asked what are likely outcomes given certain actions, factors to consider in deciding how to respond, or pros and cons of various actions to take. This would be a unique method of measuring the knowledge of the I/I KSAs possessed by an individual. It can capture information that is different than that identified in an SJT, even though both tests might tap the same KSAs.

We envision action item scenarios to be similar to SJT scenarios, but provide more explicit nonverbal cues that would be relevant to interpreting the problem situation. To try out the concept, we propose to take 3-4 scenarios (perhaps taken from the Select21 or NCO21 SJT development work) and craft questions that would pertain to the KSAs we are trying to assess. During development of the action exam, we would expect to use a short-answer response format, which would allow us to identify a large number of responses to each scenario. These responses could later be used to develop a set of multiple-choice answers to be used in the primary Army application or as a set of options that the examinee would rank from best to worst. The response type would depend on the specific question being asked. This will make large-scale data collection and scoring more efficient.

The action exam offers the opportunity to assess knowledge areas that cannot be easily assessed with other measures, and it offers an interesting research opportunity. However, there is little or no research on this type of exam, so we would have to rely on our collective test development experience in developing such a test. Another possible disadvantage of the action exam is that we have no proof that it would be an effective predictor of performance, and the cost of development would not be small. The SJT has a solid track record and we have experience developing this type of test (Keenan, 1997; Schmitt et al., 1994; Waugh, 2002), which has been shown to have incremental validity over the ASVAB (Campbell, Knapp, & Heffner, 2002).

KSAs that could be measured via an action exam or SJT include:

- Conflict Management
- Cultural Tolerance
- Relating to and Supporting Others
- Team Orientation
- Coordination
- Cooperativeness in Problem Solving
- Leading Others
- Social Perceptiveness
- Ability to Communicate Orally

Stage 2 Measures

We anticipate Stage 2 assessments will include a leaderless group discussion (LGD), a semi-structured interview, and a test of written communication ability.

Leaderless Group Discussion

In an LGD, small groups of participants are given a job-related problem to solve or a job-related issue to discuss. No leader is appointed, hence the name of the exercise. We propose to develop LGD materials and procedures that would be administered in a fairly traditional way (i.e., not involving computers). As the participants discuss the problem or issue, their activity will be videotaped and later scored by trained judges. Typically, participants are rated on dimensions such as cooperativeness, leadership, and analytical skills. However, the way the exercise is set up and the type of problem or issue given to examinees to discuss will determine the KSAs that can be measured. In some ways, this is quite similar to developing a role play. Development will include ideas about how to frame the exercise so that participants are given the opportunity to display their skill in a variety of areas. Core KSAs that could be assessed using this method include:

- Conflict Management
- Relating to and Supporting Others
- Cultural Tolerance
- Team Orientation
- Social Perceptiveness
- Leading Others
- Oral Communication

Structured Interview

The interview is one of the most commonly used methods for selecting employees for hiring, training, and promotion. Much of the early research investigating the validity of typical job interviews was disappointing. Structured interviews, however, have proven valid in many different contexts (e.g., Campion, Pursell, & Brown, 1988; Harris, 1989; Latham, Saari, Pursell, & Campion, 1980; Pulakos, Schmitt, & Keenan, 1994). In a typical structured interview, interviewees are presented a set of standardized questions developed to tap KSAs relevant to the job. Responses to the structured questions are then evaluated using well-defined, standardized scoring criteria. A structured interview is useful in measuring a variety of interpersonal skills, which are often difficult to assess well in other types of assessments. In addition, the interview provides an excellent opportunity to assess oral communication ability.

Different approaches to developing structured interview questions have been discussed in the literature. "Experience-based" interviews ask interviewees to describe experiences from their past relevant to the different dimensions of interest. Advocates of using experience-based interview questions take the position that the best predictor of future performance is past performance on the same competencies. Previous research has shown that experience-based interview questions are effective in predicting job performance for several different occupations (e.g., Motowidlo et al., 1992; Pulakos et al., 1994).

Other researchers have adopted a slightly different approach, referred to as “situational,” to developing structured interview questions. Situational questions present interviewees with hypothetical situations and ask them to describe what they would do if they were faced with the situation described. Situational questions have a couple of possible advantages over experience-based questions. First, because all interviewees are asked to respond to the same situation rather than describe whatever situation they may wish to relay from their past, the responses are likely to be easier to compare and hence score reliably across interviewees. Second, situational questions allow interviewees to indicate how they would respond to a given type of situation even if they have had no actual past experience to relay relevant to the dimension being asked.

We propose to adapt the semi-structured interview from the NCO21 project (Knapp et al., 2002). This interview includes three types of interview questions: experience-based, situational, and fact-based. Experience-based questions ask the respondent to describe the situation, how he/she behaved in the situation, and the result of the action. Hypothetical situation questions present the respondent with a realistic scenario and ask him/her to describe what he/she would be likely do in the situation. Fact-based questions assess MOS/occupation-specific knowledge and skills and have clear right answers. This may not be appropriate for identifying whether a Soldier knows how to apply interaction/interpersonal KSAs, so we will talk with SMEs as a basis for making the decision as to whether this type of question should be included in the semi-structured interview.

The NCO21 semi-structured interview uses a standard protocol for conducting the interview, selecting questions from a question bank, developing new questions, and evaluating interviewees in several target areas. Basic components of the interview include (a) a question bank, (b) target area definitions, (c) anchored rating scales for each of the target areas, (d) instructions and worksheet for developing questions to supplement the question bank, and (e) a worksheet on which to record and consolidate ratings from the interviewers. During the interview, a Soldier is asked a number of questions by a panel of two or more senior NCOs. These NCOs then use the anchored rating scales to assess the Soldier’s performance in the interview. Each rating scale ranges from 1 (low effectiveness) to 7 (high effectiveness) and contains three anchor levels (i.e., low, moderate, and high). Each anchor includes a brief description about behavior demonstrated at that level and several behavioral examples of what the interviewee might describe in his/her response.

Core KSAs that could be measured with a semi-structured interview include:

- Conflict Management
- Social Perceptiveness
- Relating to and Supporting Others
- Team Orientation
- Leading Others
- Cultural Tolerance
- Oral Communication.

Writing Skill Assessment

It is very important to ensure that the information and intent of a written message are both clearly communicated. Increasingly people are communicating via email and this is expected to be the case for the future force Soldier as well. It is an easy-to-use medium that allows immediate communication from a distance. A significant danger associated with this medium of communication is that the reader often misconstrues messages because the message does not have the context present in a conversation. There are no vocal tones, no nonverbal behaviors, or facial expressions to give cues about whether something is said in jest or sarcastically, or whether the sender really intended to say something unpleasant. This is one of the reasons that from the early stages of email development, conventions were developed to help put a voice to the written word. These conventions included such things as emoticons (e.g., smiley or frown faces) and not using all capital letters (which indicates shouting).

We propose to develop a test of written communication that assesses the clarity of a message, both in content and tone. This test will *not* assess technical writing skills such as punctuation, grammar, or vocabulary. The test will likely involve construction of several email messages in response to a stated problem. There might be a single situation that requires several messages and/or several situations. We will try out different approaches to setting up the exam, including informing examinees about how their messages will be scored (e.g., being able to get the message across is more important than grammar or spelling) versus not providing this information and providing more or less guidance on the parameters of the messages they are expected to craft. It will also be interesting to look at whether we can get more informative assessments by giving examinees strict time limits versus allowing them ample time to construct and review their messages.

Unlike the other Stage 2 assessments, the writing examination will be entirely automated. What is unclear at this stage, however, is whether we can develop an automated scoring routine. At this point, we think it is likely that some human judgment will be required for scoring the test, but that these judgments will be very straightforward to make.

Effects of Uncontrolled Variables

In addition to the I/I KSA assessments, we recommend including measures of general cognitive aptitude and personality in the Phase II research. As explained in this section, these measures will help ensure a fuller understanding of how these variables impact how well examinees perform in the assessment battery.

Each of the I/I KSAs could be assessed using observations of actual job performance. However, it is important to remember that knowing what to do and having the skill to use the knowledge may not always result in the expected behavior. The difference between actual performance and skill as assessed by tests is that the performance context adds additional sources of variation that are controlled for in a skill assessment [personal communication, John Campbell, 2003]. Variance in skill level as assessed in a standardized measurement procedure is, in turn, a function of general cognitive aptitude, procedural knowledge relevant for the skill, and a variety of dispositional variables (e.g., personality) that are viewed as stable traits. Dispositional variables that are *not* stable would be things like self-efficacy, which is likely to vary according to the situation. Personality dispositions play a role because we are interested in assessing interpersonal skills that may be constrained or enhanced by one's personality. The same would not be true for

standardized assessments of technical skills. One could “know” what to do relative to skill expression, but have difficulty doing it, even in a role play, because of constraints imposed by one’s “personality.” Figure 4 presents a diagram of the way we view the interaction of general cognitive aptitude, personality, knowledge, and skill on performance. The solid lines are the hypothesized direct effects. The dashed lines are residual direct effects that *could* occur. For example, general cognitive aptitude could have a residual effect on skill level, or on performance, even after its direct effect on knowledge is accounted for.

Anticipating the importance of personality and general cognitive aptitude A in performance on the experimental assessment battery, we propose to include personality measures in the Stage 1 assessment package and will retrieve an estimate of general cognitive aptitude from Soldiers’ automated personnel records. Specifically, in addition to the TAP/BIQ Amalgam (a biodata measure targeted to assess personality variables), we will include a measure derived from the International Personality Item Pool (IPIP) (currently being used as a marker test for personality for Select21) and possibly the Person-Organization-Personality (POP) Hybrid, a personality measure being developed in the Select21 project. The general cognitive aptitude measure will either be the General Technical or Armed Forces Qualification Test scores from the Armed Services Vocational Aptitude Battery (ASVAB).

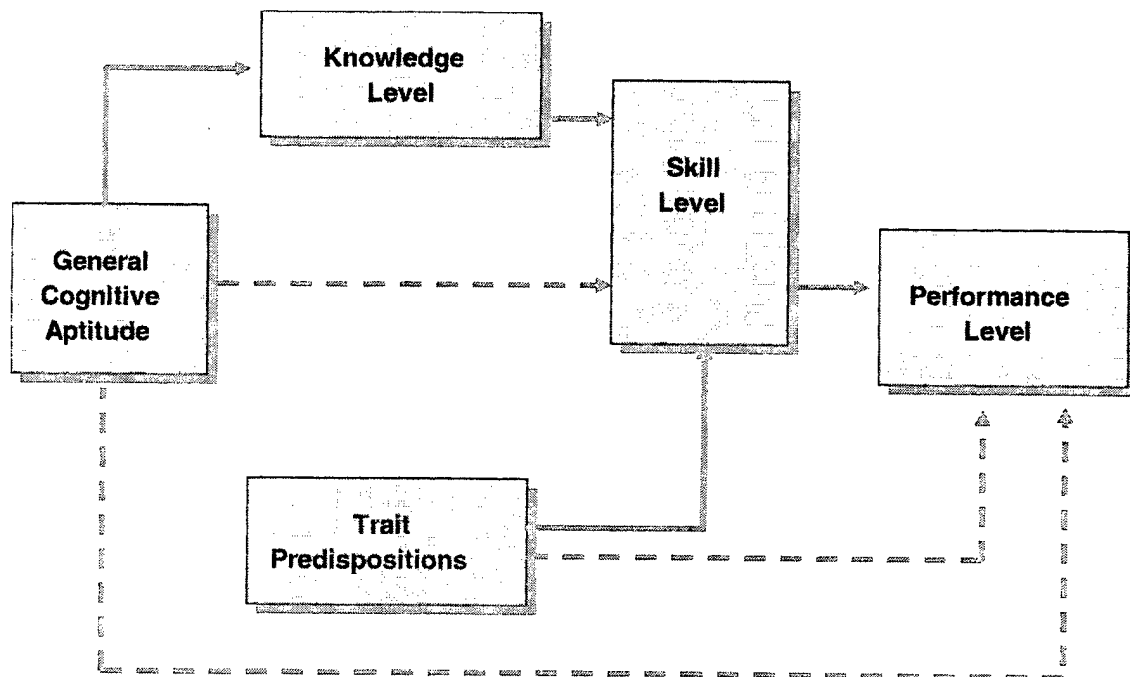


Figure 4. The hypothesized effects of general cognitive aptitude, personality, knowledge, and skill on performance.

Personality Measures

International Personality Item Pool (IPIP)

The International Personality Item Pool (IPIP) bills itself as “A Scientific Collaboratory for the Development of Advanced Measures of Personality Traits and Other Individual Differences”

(<http://ipip.ori.org/ipip/>). A collaboratory is a computer-supported system that allows scientists to work with each other, facilities, and data bases without regard to geographical location (Finholt & Olson, 1997). The IPIP Website is intended to provide rapid access to measures of individual differences, all in the public domain, to be developed conjointly among scientists worldwide. The site provides a pool of 1,956 items organized into 280 scales that have been developed to measure constructs similar to those in proprietary tests, such as the NEO-PI (Costa & McRae, 1992). The relevant IPIP scales line up against the Big Five personality factors as follows (see Table 5):

Table 5. Comparison of Big Five Personality Factors to IPIP Scales

Big Five Personality Factors	IPIP Scales
• Conscientiousness	• Dependability, Need to Achieve, Self-Reliance
• Agreeableness	• Agreeableness (Relating to and Supporting Others)
• Neuroticism	• Emotional Stability
• Openness to Experience	• Intellectance (Adaptability/Flexibility)
• Extroversion	• Potency, Affiliation (Team Orientation)

Any researcher who wishes to develop an instrument is free to use the items in the IPIP. The website offers many options. For example, there is set of 50 items that are balanced between positively and negatively keyed responses and ready to be used. This set of items is being tested in the Select21 project as a marker for other measures related to personality or temperament. A marker test is one that has been shown to measure quite well one or more particular personality characteristics (for example, agreeableness). We use a marker test as a basis of comparison when trying out a new or experimental measure designed to assess the same characteristic(s). We compare examinees' scores on the marker test to scores on the experimental measure. If the experimental measure works as it is supposed to (that is, if it measures the characteristic(s) well), then people who score high (low) on the marker test should also score high (low) on the experimental measure--that is, they should score the same on both measures. Researchers who use the scales often report their results to the host of the site (Goldberg, 1999), who updates the statistics. The Agreeableness scale (equivalent to our Amicability KSA) has an alpha coefficient of .77. The items in that scale are shown in Figure 5.

Positively keyed items	Have a good word for everyone. Believe that others have good intentions. Respect others. Accept people as they are. Make people feel at ease.
Negatively keyed items	Have a sharp tongue. Cut others to pieces. Suspect hidden motives in others. Get back at others. Insult people.

Figure 5. Positively and negatively keyed items from the IPIP Agreeableness scale.

The site provides a set of sample instructions and response options for administering IPIP items. They read as follows:

“On the following pages, there are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes *you*. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then fill in the bubble that corresponds to the number on the scale.”

Response Options

- 1: Very Inaccurate
- 2: Moderately Inaccurate
- 3: Neither Inaccurate nor Accurate
- 4: Moderately Accurate
- 5: Very Accurate

Because we had established the advisability of assessing personality factors, we then were faced with the task of identifying a measure that would fit into our project needs and budget. We had previously decided that using a COTS product was not feasible due to cost and the time lapse in scoring the tests. The IPIP appears to offer a feasible solution to these constraints. According to the information on the website, the items are free to use with no permission required, they have been used in many studies (citations provided on the website), the existing scales have internal reliability statistics, and the items have been shown to correlate with the NEO factors. We have the flexibility of creating our own scales should we wish to do so or using either the 50- or 100-item scales that have already been developed.

Person-Organization-Personality (POP) Hybrid

The Person-Organization-Personality (POP) Hybrid is a self-report personality measure being developed for Select21. It is designed to assess how well the person and organization fit together and whether the organization provides work that has characteristics the individual finds enjoyable. Using either a forced choice or ranking format (the approach is still being developed) respondents indicate work requirements at which they think they would be most successful. Two sample POP Hybrid items are listed below:

Work that requires...

- A. Showing a cooperative and friendly attitude towards others you dislike or disagree with
- B. Being open to change (positive or negative) and a lot of variety

As noted previously, a commonly acknowledged problem with personality measures is that people can fake their responses to make themselves look better (Hough, Eaton, Dunnette, Kamp & McCloy, 1990; Ones, Viswesvaran, & Korbin, 1995) and that many will do so in operational selection settings (Hough, 1996, 1997, 1998; Rosse, Stechler, Miller, & Levin, 1998). Given their experience with the

Army's Assessment of Individual Motivation (AIM; Knapp, Waters, & Heggstad, 2002), researchers on the Select21 project believe that response distortion poses a dauntingly high hurdle to the personnel selection specialist interested in using temperament measures in an operational setting.

Recent efforts to reduce response distortion have centered on forced-choice formats, which ask the respondent to choose between two alternatives as being more appealing to him/her. Each alternative in the instrument is paired with every other alternative. This approach has demonstrated the capacity to reduce the effects of faking (Jackson, Wroblewski, & Ashton, 2000; White & Young, 1998; Wright & Miederhoff, 1999), but it is criticized because it results in ipsative response data. It is too often easy for respondents to identify the constructs of interest and to skew their responses to make themselves look good.

The 15 statements in the POP Hybrid are adapted from the Work Styles portion of the O*NET content model (Borman, Kubisiak, & Schneider, 1999). The wording has been simplified to make them more accessible to a casual reader. KSAs that can be measured with the POP Hybrid include:

- Dependability
- Relating to and Supporting Others
- Social Perceptiveness
- Team Orientation

We believe this combination of measures will allow us to determine whether examinees have sufficient knowledge about what to do in various situations, or how to read situations, so that they could perform well in a standardized environment. The collection of biodata and personality data will help us control for the effects of those variables in our analysis.

Experience Measures

One of the best predictors of knowledge level will be experience. Each participant will provide his or her pay grade, which will be a good estimate of experience. As an additional measure of experience, we will develop an instrument similar to the Experience and Activities Record (ExAct) developed for NCO21. The ExAct is a 46-item self-report measure designed to "assess the extent to which a Soldier has engaged in specific activities or had particular experiences that may predict performance at the next grade" (Knapp et al., 2002, p. 55). The premise behind use of such an instrument is that having prior experience should prepare a Soldier to perform those or similar activities in the future. The ExAct itself is not likely to be suitable for the more limited set of I/I KSAs in which we are interested, but it will provide a model we can use to guide our thinking about what types of experience would be appropriate to consider for this project.

Computerization of Proposed Assessment Methods

Traditionally, measures of I/I KSAs have been administered either as paper-and-pencil instruments (e.g., questionnaires, tests) or as interviews or other tests that were manually scored by observers. Many of these assessments have answer formats that allow them to be scored by computers, with participant information and scores stored in a database. More recently, some of these measures have been computerized so that the participant reads the test items on the

computer interface and responds using the keyboard. But this assessment technique does not take advantage of new technological and bandwidth capabilities readily available on laptops and other portable devices such as Personal Digital Assistants (PDAs).

Current advanced information technology and the increased bandwidth available on laptop computers and other portable devices has allowed computerized versions of assessment instruments to be developed that can be administered in almost any setting by personnel without specialized training in test administration. Micro Analysis and Design (MA&D) has developed several innovative computer-based training tools that have tests as a component. Two examples of these tools, the Course of Action Training Tool (COATT) and the Multimedia Instructional Tutoring Authoring System (MITAS), could serve as the basis for innovative I/I KSA measurement techniques. MITAS and COATT, which are interactive and incorporate multimedia, 3D graphical animation, speech recognition, natural language processing, exercise development templates, and performance based sequencing, offer us the opportunity to create valid and reliable versions for computer-based action tests that are easily administered and scored. They also collect performance data and provide performance feedback.

In Stage 1 of the I/I KSA assessment process, we intend to leverage the technologies that are part of COATT and MITAS to aid in the development of the action exam or SJT. The technologies employed in these two tools have a variety of potential applications for the development of the action exam or SJT. One potential KSA that can be measured by the action exam or SJT is conflict management. Assessing this KSA in the action exam or SJT using COATT and MITAS technologies could take on a number of different forms.

For example, COATT utilizes a task network model of the process of piloting a helicopter to an accident scene. The model simulates the actions the pilot would take, such as requesting weather updates, communicating current position, changing altitude, and deciding whether to continue with the mission. As the model executes, a pilot in training watches as rolling video depicting the given scenario is played on the screen (see Figure 6). At critical decision points in the model, the trainee is asked to make decisions about the most appropriate actions to take. In COATT, the scenario responds to the pilot's actions and can take different paths based on the pilot's choices. For our purposes, the use of branching would be limited because branching significantly complicates scoring. However, the ability of the COATT tool to depict relevant scenarios using live action video footage, to halt that footage at critical decision points and request a response from the participant could be implemented for assessing the I/I KSAs.

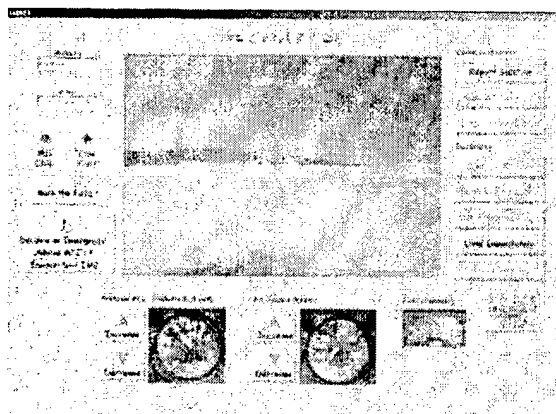


Figure 6. The course of action training tool.

The technique could be applied to assessing a Soldier's ability to manage an interpersonal conflict situation using either rolling video or 3-D computer simulations (see Figure 7). In this context, the underlying model would represent the process of working through the interpersonal conflict situation and managing the scenario to successfully resolve conflict. As the task network model of the conflict scenario executed, the video of a scenario or the 3-D animation could play. When the model reached critical decision points the Soldier could be asked to either choose the best response given the conflict they have been observing, or the Soldier could be required to do things such as identify key characteristics of the scenario, provide a situation status report to their supervisor or to specify the action they would take to lead to resolution of the conflict. However, instead of choosing the path to follow based on the Soldier's decision, the assessment would record and score the candidate's response and continue along the pre-defined scenario path. As the scenario progressed at each pre-determined point the scenario could be stopped and the user prompted for a response. For a more traditional SJT, each scenario would have a set of response options associated with it. In contrast, in an action exam variation, the scenario could be stopped at key points and a set of questions presented and, after capturing the responses, the same scenario could continue allowing further observation of the developing scenario. The responses would be captured and stored for use in scoring the user's assessment and for the purpose of collecting data on individual item properties and the properties of the test as a whole. By administering the test via a computer and storing data on examinee performance, the assessment tool would provide information regarding the soundness of the test, thus allowing for frequent evaluation of the assessment. Along with presenting the scenario using video footage or computer simulation, COATT could provide the capability to present response options through video or simulation. In this case, following a scenario stem a set of alternate endings could be played out for the examinee and they could choose the most acceptable outcome of the scenario. It is unlikely that we will employ this option because the choice of a correct response would require a significant amount of memory.

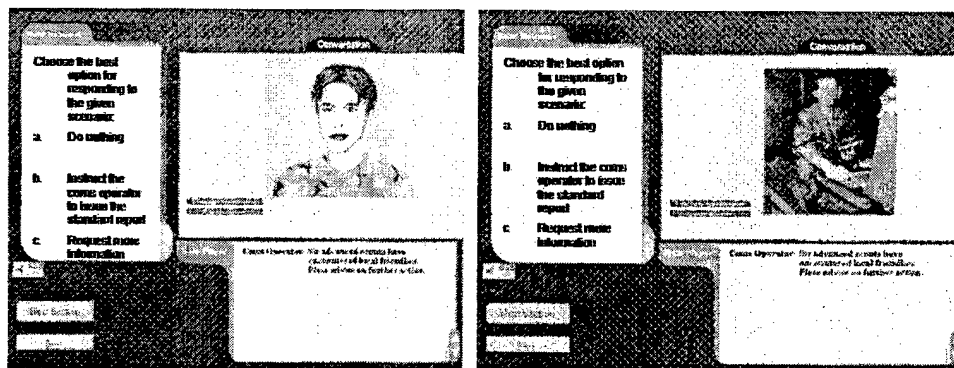


Figure 7. Using COATT technology to assess I/I KSAs.

A second possible implementation of the technologies in COATT and MITAS to assessing I/I KSAs is the use of MITAS's built in exercise templates to aid in rapid test development, prototyping and update (Figure 8). The MITAS software suite offers a set of exercise development templates that allow the test developer to associate video, audio, or text materials with a given item. For an action exam or SJT, these templates could be used to create a wide variety of items, including multiple-choice, short answer, and rank ordering of response alternatives. For each of these exercises a specific scenario could be presented either through text as in traditional versions of these assessments or through video or computer animation. Additionally, the MITAS tool allows for easy sequencing of items through a drag and drop interface. Using the MITAS interface would enable testing of multiple test configurations during the test development process to explore order effects that may influence the difficulty of specific test items.

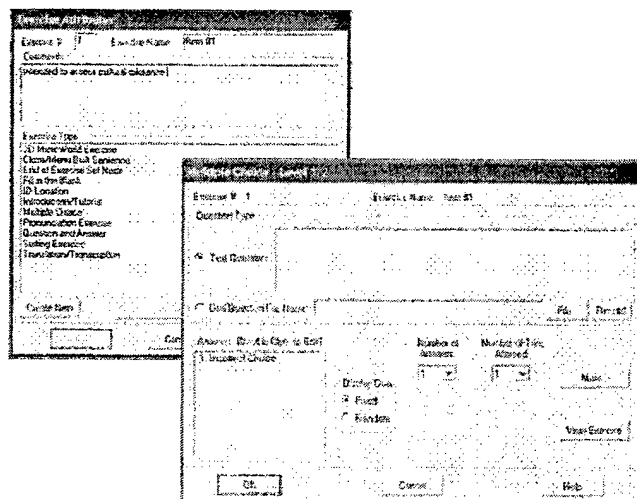


Figure 8. Exercise development template in MITAS.

In Stage 1 of the assessment process, the ability to present customized scenarios, using either live action video footage or computer simulation, could be used to present the stimuli in a structured interview. In this setting, computer technology would be employed to present the interview questions through video or computer simulation. The videotaped interviewer or a simulated interviewer could be designed to ask questions of the examinee. The participant could then respond to the questions either verbally and have the responses captured using either video or audio tape (or both) or through a text based response entered via a keyboard. The responses would then be stored for later evaluation by trained assessors. The use of technology to present

the interview questions eliminates the need for a trained interviewer and as such requires less up front resources to administer the assessment. Additionally, if responses were recorded textually via a keyboard, as technologies geared toward interpreting meaning from text (such as Latent Semantic Analysis) mature, they could be implemented in the assessment to provide automated scoring of the structured interview.

The technologies that underlie the COATT and MITAS products offer a variety of opportunities for assessing I/I KSAs. From the ability to present realistic scenarios using video footage or computer animation to capturing, scoring and storing detailed information on examinee performance and rapid prototype development, the use of emerging technologies will create a powerful tool for assessing I/I KSAs.

PHASE II PLAN

The Phase II effort will follow a traditional assessment development approach to create the 2-stage measurement battery. With a projected start in November of 2003, the project will begin by drafting the scenarios for the action exam that will be included in the first stage of the assessment process. Along with developing the action exam scenarios, development of the structured interview and LGD materials will begin. In the early stages of developing the action exam scenarios, interview and LGD materials, project staff will present the materials to SMEs in an initial workshop. During the workshop the SMEs will comment on the scenarios, help flesh them out, make them appropriate for use with the Army and provide ideas for additional scenarios. At subsequent workshops, SMEs will review progress made on the materials and continue to provide feedback to shape the materials into useful assessments targeted for the Army. Once the initial draft materials are prepared, another SME workshop will be convened where SMEs will identify possible actions that the respondent could take. This list of actions will be reviewed in at least two workshops and the output of these workshops will be used to develop a scoring protocol.

Along with developing the test materials we plan to establish construct and criterion-related validity of the predictor assessments. To do this we will work with ARI to identify existing performance measures that may be appropriate criteria for the current effort. These criterion measures may include job performance ratings scales developed specifically for this project as well as existing criteria such as relevant scales from the NCO21 and Select21 criterion rating scales. Each of the criteria will be used in a criterion-related validation effort once the final I/I KSA measures have been developed.

Once the initial draft assessments have been developed and appropriate criterion measures have been selected we will conduct internal reviews with contractor staff members and ARI personnel to serve as pre-test examinees. The assessments will then be revised and finalized in preparation for pilot testing with 50-75 Soldiers at one or two Army installations in April 2005. The pilot testing will include collection of performance measures used to provide initial evidence of instrument validity. Following the pilot testing, the contractor team will evaluate the assessments for their psychometric properties and revise them as required to maximize their reliability and validity.

The final step in the assessment development process will be to conduct the larger scale validation effort. Ideally, this validation effort would include assessing at least 200 Soldiers representing various MOS across four to five Army installations¹. We also intend to collect criterion ratings, which will require access to supervisors and/or peers of the Soldier participants to provide performance ratings. Along with collecting data on the I/I KSA measures, we intend to collect data on participants' general cognitive aptitude as measured by the ASVAB. The GMA measure will allow us to determine the relationship between our measures of the I/I KSAs and overall GMA and account for this relationship in the scoring routines.

At the conclusion of Phase II the contractor team will provide ARI with a comprehensive report detailing the development activities and providing commercial quality user documentation for the assessment battery. This report and accompanying documentation will serve as the final deliverable for the Phase II effort and will accompany the 2-stage assessment battery as the ultimate products of the research and development effort.

¹ If Soldiers are not available, we will try to gain access to college students. If we use civilians, we will need an alternative measure of GMA (e.g., self-report SAT scores).

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APPENDIX A: MEASUREMENT METHODS AND TESTS GROUPED BY KSA

Ability to Relate to and Support Peers

- ❖ Self-report Method
 - Fixed Response
 - California Psychological Inventory
 - Personality Research Form
 - Adjective Checklist
 - Survey of Interpersonal Values
 - Scenario-based Fixed Response
 - Situational Judgment Test
- ❖ Computer-based Simulation Method
 - High Fidelity Stimulus/Low Fidelity Response
 - Situational Judgment Test

Affiliation

- ❖ Self-report Method
 - Fixed Response
 - NEO-PI
 - Edwards Personal Preference Schedule
 - Personality Research Form
 - Adjective Checklist
 - Comfrey personality Scales
 - California Psychological Inventory
 - Scenario-based Fixed Response
 - Situational Judgment Test
- ❖ Computer-based Simulation Method
 - High Fidelity Stimulus/Low Fidelity Response
 - Situational Judgment Test

Agreeableness

- ❖ Self-report Method
 - Fixed Response
 - NEO-PI
 - 16PF
 - Gordon Personal Profile
 - Biographical Information Questionnaire
 - Jackson Personality Inventory-Revised
 - ABLE
 - Forced Choice
 - Assessment of Individual Motivation (AIM)

Concern for Soldier Quality of Life

- ❖ Self-report Method
 - Fixed Response
 - California Psychological Inventory
 - Personality Research Form
 - Edwards Personal Preference Schedule
 - Survey of Interpersonal Values
 - Jackson Personality Inventory - Revised
 - Scenario-based Fixed Response
 - Situational Judgment Test
- ❖ Computer-based Simulation Method
 - High Fidelity Stimulus/Low Fidelity Response
 - Situational Judgment Test

Conflict Management

- ❖ Self-report Method
 - Fixed Response
 - California Psychological Inventory
 - Personality Research Form
 - Edwards Personal Preference Schedule
 - ABLE
 - 16PF
 - Free Response – Open-ended Items
 - Biodata
 - Forced Choice
 - Assessment of Individual Motivation (AIM)
 - Scenario-based Fixed Response
 - Situational Judgment Test
- ❖ Computer-based Simulation Method
 - High Fidelity Stimulus/Low Fidelity Response
 - Situational Judgment Test

Cultural Tolerance

- ❖ Self-report Method
 - Fixed Response
 - Cultural Tolerance Scale
 - Adjective Checklist
 - California Psychological Inventory
 - Jackson Personality Inventory - Revised
 - 16PF
 - Scenario-based Fixed Response
 - Situational Judgment Test
- ❖ Computer-based Simulation Method
 - High Fidelity Stimulus/Low Fidelity Response
 - Situational Judgment Test
- ❖ Real Life Behavior Method
 - ABLE

Dependability

- ❖ Self-report Method
 - Fixed Response
 - California Psychological Inventory (CPI)
 - 16PF
 - Gordon Personal Profile
 - Personality Research Form
 - Adjective Checklist
 - California Psychological Inventory
 - Jackson Personality Inventory - Revised
 - 16PF
 - Free Response – Open-ended Items
 - Biodata
 - Forced Choice
 - Assessment of Individual Motivation (AIM)
- ❖ Computer-based Simulation Method
 - High Fidelity Stimulus/Low Fidelity Response
 - Situational Judgment Test
- ❖ Real Life Behavior Method
 - Attendance records, performance goals, accomplishments

Team Orientation

- ❖ Self-report Method
 - Fixed Response
 - 16PF

Adaptability/Flexibility

- ❖ Self-report Method
 - Fixed Response
 - California Psychological Inventory
 - 16PF
 - Biographical Information Questionnaire
 - Cross Cultural
 - Adjective Checklist
 - Adaptability Test

Cooperativeness in Problem Solving

- ❖ Self-report Method
 - Fixed Response
 - California Psychological Inventory
 - ABLE
 - Adjective Checklist
 - Free Response – Open-ended Items
 - Biodata
 - Forced Choice
 - Assessment of Individual Motivation

- ❖ Live Action Method
 - Role Play
 - Interaction Exam
 - Leaderless Group Discussion

Cooperation

- ❖ Self-report Method
 - Fixed Response
 - Jackson Personality Inventory - Revised
 - Adjective Checklist

Emotional Intelligence

- ❖ Self-report Method
 - Fixed Response
 - Balanced Emotional Empathy Test
 - 16PF

Social Perceptiveness

- ❖ Self-report Method
 - Fixed Response
 - California Psychological Inventory
 - 16PF
 - Adjective Checklist
 - Jackson Personality Inventory - Revised

Active Listening

- ❖ Self-report Method
 - Fixed Response
 - Biographical Information Questionnaire
- ❖ Computer-based Simulation Method
 - High Fidelity Stimulus/Low Fidelity Response
 - Watson Barker HS Listening Test
 - Active Listening Test
- ❖ Live Action Method
 - Individual
 - Active Listening Test
 - Role Play
 - Interaction Exam
- ❖ Real Life Behavior Method
 - Performance Ratings
 - Leaderless Group Discussion

Nonverbal Skills

- ❖ Self-report Method
 - Fixed Response
 - 16PF

- ❖ Live Action Method
 - Role Play
 - Interaction Exam

Self-Awareness

- ❖ Self-report Method
 - Fixed Response
 - Adjective Checklist

Oral Communication Skills

- ❖ Self-report Method
 - Fixed Response
 - PPF21
- ❖ Computer-based Simulation Method
 - High Fidelity Stimulus/Low Fidelity Response
 - The English Language Skills Profile
- ❖ Live Action Method
 - Role Play
 - Interaction Exam
 - Group Simulation
 - Alberta Education Oral Communication Evaluation
- ❖ Real Life Behavior Method
 - Performance Ratings
 - Communication Competency Assessment Instrument

Written Communication Skills

- ❖ Self-report Method
 - Fixed Response
 - PPF21

Act as a Role Model

- ❖ Self-report Method
 - Fixed Response
 - California Psychological Inventory

Task Leadership

- ❖ Self-report Method
 - Fixed Response
 - 16PF
 - Survey of Interpersonal Values
 - Biographical Information Questionnaire

Helping Others

- ❖ Self-report Method
 - Fixed Response
 - Personality Research Form
 - Adjective Checklist
 - 16PF
 - Edwards Personal Preference Schedule

APPENDIX B: UTILITY TO THE ARMY CALCULATIONS AND JUSTIFICATIONS

Appendix B presents the Utility to the Army (UA) calculations for each of the I/I KSAs included in the final taxonomy developed under the Phase I research and development effort. Where appropriate the KSAs are grouped into the major constructs for which they are constituents. The constructs, KSAs and measurement methods described in this appendix represent an intermediate step in developing the final I/I KSA taxonomy. The UA scores, coupled with further research into the I/I KSAs led to a refinement of the taxonomy that is reflected in the discussion of the taxonomy throughout much of this report. In this appendix the 20 I/I KSAs are arranged into four major constructs: (1) Building and maintaining relationships; (2) Social intelligence; (3) Communications and (4) Team Leadership. The final taxonomy takes the 20 individual I/I KSAs and derives 9 core I/I KSAs which include the essential features of the original list of KSAs (See Table 2).

Deriving UA Scores

$$\begin{aligned} \text{Utility to the Army} &= \text{Appropriateness } ((6 - \text{Fakability}) + (6 - \text{Ease of Implementation})), \\ &\text{or} \\ \text{UA} &= A ((6 - F) + (6 - EI)) \end{aligned}$$

If a measure has been rated as “*Not appropriate*” ($A = 0$) for assessing a particular KSA, it essentially has no utility to the Army, in which case the $UA = 0$ and the method will not be considered.
 $UA = 0$

If a measure has been rated as “*Appropriate*” ($A = 1$), then the UA of that method is the sum of 6 - the Fakability score plus 6 - the Ease of Implementation score (this reverses the scoring for these factors to make them directionally the same as Appropriateness). These scores can range from 2 - 10. High scores have more UA.

If a measure has been rated as “*Very appropriate*” ($A = 2$), then the UA equals 2 $((6 - F) + (6 - EI))$. These scores can range from 4 - 20. High scores have more UA.

The following pages outline the UA for each KSA and method pairing as described in the paragraphs above. These pages also provide a rationale for the ratings. The ratings and associated rationale formed the basis for the decision of which methods to implement in the final assessment battery.

Group 1: Building and Maintaining Relationships Construct

Rationale for method selection: These KSAs assess the Soldier's attitudes toward colleagues and teammates based on behaviors, and their ability to form and maintain productive relationships. Asking Soldiers to perform a task in a simulation or role play that requires that the Soldier to demonstrate the behaviors that are markers for the construct *Build and Maintain Relationships (relate to and support peers, affiliation, amicability, concern for Soldier quality of life, conflict management, dependability, and team orientation)* will allow us to assess the degree to which the markers are observed in an individual's behavior. The methods, which are most appropriate for assessing this group of KSAs, require the identification of appropriate scenarios/tasks and the markers of the construct *Build and Maintain Relationships*. For Soldiers who have experience in the military, performance ratings should also reveal behaviors related to this KSA. Biodata or historical information may also be useful, and such information can be gathered using a questionnaire-type form or through the use of structured interviews.

Potential problems with the method: This trait could be faked, even when a realistic assessment such as a Live Action Group is employed. Most Soldiers will understand what behaviors are expected of them. Detecting faking may be difficult, and scoring is difficult and time consuming and requires a trained scorer (ideally two, so the reliability of the scoring can be assessed). With scenario based fixed response "tests," creating and validating the scenarios and a reasonable range of markers is a challenging but doable task. Questionnaires or structured interviews intended to gather this information might not be useful for Soldiers with little or no relevant work experience

Ability to Relate to and Support Peers. The degree to which the individual treats peers in a courteous, respectful, and tactful manner. Provides help and assistance to others. Backs up and fills in for others when needed. Works effectively as a team member.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Real life behavior | UA = 9-18 |
| (2) Live Action | UA = 10-12 |
| (3) Simulations | UA = 10-12 |
| (4) Interview | UA = 6-7 |
| (5) Self report | UA = 6-7 |

Affiliation. The degree of sociability that one exhibits. Is outgoing, participative, and friendly versus shy and reserved.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Live action | UA = 10-12 |
| (2) Simulations | UA = 10-12 |
| (3) Real life behavior | UA = 8 |
| (4) Self report | UA = 6-7 |
| (5) Interviews | UA = 5 |

Amicability. The degree of pleasantness versus unpleasantness exhibited in interpersonal relations. Exhibits good will towards others and an absence of antagonism. Is tactful and helpful rather than defensive, touchy, and generally contrary.

Assessment methods in order of UA:

- | | |
|------------------------|-----------|
| (1) Live action | UA = 10 |
| (2) Simulations | UA = 8-10 |
| (3) Real life behavior | UA = 7 |
| (4) Interviews | UA = 7 |
| (5) Self report | UA = 6-7 |

Concern for Soldier Quality of Life. Is sensitive to others' priorities, interests, and values, and tries to assist them in making their personal and family life better.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Live action | UA = 10-12 |
| (2) Self-report | UA = 5-8 |
| (3) Real life behavior | UA = 7 |
| (4) Self-report | UA = 6-8 |
| (5) Simulations | UA = 4-5 |

Conflict Management. The degree to which the individual encourages and supports different perspectives, avoids harmful conflict, constructively addresses disagreements that undermine team performance, and does not allow conflicts with others in ways that preserve good relations and enhance trust.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Simulation | UA = 10-12 |
| (2) Live action | UA = 8-12 |
| (3) Real life behavior | UA = 7-8 |
| (4) Self-report | UA = 5-7 |
| (5) Interviews | UA = 4-5 |

Cultural Tolerance. The degree to which an individual demonstrates tolerance and understanding of individuals from other cultural and social backgrounds, both in the context of the diversity of U.S. Army personnel and interactions with foreign nationals during deployments or when training for deployment.

Assessment methods in order of UA:

- | | |
|------------------------|-----------|
| (1) Interviews | UA = 8-12 |
| (2) Live action | UA = 8 |
| (3) Real life behavior | UA = 7-8 |
| (4) Simulation | UA = 6-8 |
| (5) Self-report | UA = 5-8 |

Dependability. The person's characteristic degree of conscientiousness. Is disciplined, well organized, planful, and respectful of laws and regulations.

Assessment methods in order of UA:

- | | |
|------------------------|----------|
| (1) Real life behavior | UA = 16 |
| (2) Interviews | UA = 5 |
| (3) Live action | UA = 4-5 |
| (4) Simulation | UA = 2-3 |
| (5) Self-report | UA = 0-3 |

Team Orientation. The degree to which an individual identifies with the team and other team members and works to boost team morale and increase the team bond by creating and maintaining a supportive work environment; willingness to put the needs of the team ahead of personal needs.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Interviews | UA = 10-12 |
| (2) Live action | UA = 10 |
| (3) Self-report | UA = 7-10 |
| (4) Real life behavior | UA = 7-8 |
| (5) Simulation | UA = 6-8 |

Group 2: Social Intelligence Construct.

Rationale for method selection: These KSAs assess the Soldier's social judgments, flexibility, and ability to work in harmony with others. Asking Soldiers to perform a task in a simulation or role play that requires that the Soldier demonstrate the behaviors that are markers for the Social Intelligence Construct will allow us to assess the degree to which the markers are observed in an individual's behavior. The

methods, which are most appropriate for assessing this group of KSAs, require the identification of appropriate scenarios/tasks and the markers of the construct *Build and Maintain Relationships*.

Potential problems with the method: This trait could be “faked,” even when a realistic assessment such as a Live Action Group is employed. Most Soldiers will understand what behaviors are expected of them. Detecting faking may be more difficult in Live Action Group exercises, and scoring is difficult and time consuming and requires a trained scorer (usually two to assess the reliability of the assessment). With scenario-based fixed-response tests creating and validating the scenarios and a reasonable range of markers is a challenging but doable task.

Adaptability/Flexibility. The degree to which an individual is able to respond to rapidly changing situations (e.g., assignments, relocation, new Soldiers) and accept new roles.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Interviews | UA = 10 |
| (2) Live action | UA = 10-12 |
| (3) Simulation | UA = 8-10 |
| (4) Self-report | UA = 5-14 |
| (5) Real life behavior | UA = 7-8 |

Coordination. The ability to work interdependently to reach task completion, share information and effort, and work together with others. Can adjust own time and work activities to ensure interdependent tasks are completed effectively.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Live action | UA = 10-14 |
| (2) Simulation | UA = 10-12 |
| (3) Real life behavior | UA = 7-8 |
| (4) Self-report | UA = 4-8 |
| (5) Interviews | UA = 0-6 |

Social Perceptiveness. The degree to which an individual is able to monitor own and other's emotions, discriminate among them, and use the information to guide one's thinking and actions, allowing one to work cooperatively with others. Is aware of how own behavior impacts others.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Simulation | UA = 10-12 |
| (2) Live action | UA = 8-12 |
| (3) Interviews | UA = 6-7 |
| (4) Self-report | UA = 4-7 |
| (5) Real life behavior | UA = 0-7 |

Group 3: Communications Construct

Rationale for method selection: These KSAs assess the Soldier's ability to communicate effectively, both non-verbally and through verbal means (written and spoken). Asking Soldiers to perform a task in a simulation or role play that requires that the Soldier demonstrate the behaviors that are markers for the Communication Construct will allow us to assess the degree to which the non-verbal and spoken markers are observed in an individual's behavior. The non-verbal and oral communication KSAs can be assessed during live action assessment techniques. The KSA for written communication can be best assessed through writing samples or from performance ratings and work product reviews. The methods, which are

most appropriate for assessing this group of KSAs, require the identification of appropriate nonverbal and verbal communication tasks and the markers of the construct *Communication*.

Potential problems with the method: This trait will be difficult to fake and can be objectively scored. Scoring of active listening, nonverbal and verbal communication behaviors may be more difficult and time consuming than scoring written communications, and requires a trained scorer (usually two to assess the reliability of the assessment).

Active Listening. The ability to listen non-evaluatively to instructions and related messages, focusing on the person communicating. Asks and responds to questions as appropriate. Pays attention to nonverbal cues to help clarify/interpret messages.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Live action | UA = 12-16 |
| (2) Interviews | UA = 12-14 |
| (3) Simulation | UA = 8 |
| (4) Real life behavior | UA = 0-6 |
| (5) Self-report | UA = 0 |

Nonverbal Skills. The ability to match verbal and nonverbal messages when speaking to clarify and enhance the message. The degree to which an individual can accurately interpret the nonverbal signals of others.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Interviews | UA = 16 |
| (2) Live action | UA = 12-14 |
| (3) Simulation | UA = 0 |
| (4) Self-report | UA = 0 |
| (5) Real life behavior | UA = 0 |

Oral Communication Skills. The ability to speak clearly and precisely so that others can easily understand. The ability to adapt speaking style and comments to the audience as appropriate.

Assessment methods in order of UA:

- | | |
|------------------------|----------|
| (1) Interviews | UA = 16 |
| (2) Live action | UA = 16 |
| (3) Real life behavior | UA = 0-8 |
| (4) Simulation | UA = 0-7 |
| (5) Self-report | UA = 0 |

Written Communication Skills. The ability to write clearly so that message is understood by the reader. Is sensitive to the limitations of written communication and carefully phrases message (e.g., email) so that the intent is clearly understood by the receiver.

Assessment methods:

- | | |
|------------------------|-----------|
| (1) Real life behavior | UA = 8-10 |
|------------------------|-----------|

Group 4: Team Membership Construct

Ability to Provide Feedback to Team Members. Provides constructive suggestions to other team members for improving their own and team performance. Informs team members when their performance is hindering achievement of team mission.

Assessment methods in order of UA:

- | | |
|------------------------|----------|
| (1) Live action | UA = 12 |
| (2) Real life behavior | UA = 6-7 |
| (3) Interviews | UA = 6 |
| (4) Simulation | UA = 0 |
| (5) Self-report | UA = 0 |

Acts as a Role Model. Exhibits self-confidence and a positive attitude. Presents a positive and professional image of self and the Army even when off duty.

Assessment methods in order of UA:

- | | |
|------------------------|-----------|
| (1) Real life behavior | UA = 6-16 |
| (2) Live action | UA = 12 |
| (3) Interviews | UA = 6 |
| (4) Simulation | UA = 0 |
| (5) Self-report | UA = 0 |

Cooperativeness in Problem-Solving: The ability to take advantage of multiple perspectives to find effective solutions to problems.

Assessment methods in order of UA:

- | | |
|------------------------|-----------|
| (1) Live action | UA = 8-10 |
| (2) Real life behavior | UA = 7-8 |
| (3) Interviews | UA = 4 |
| (4) Self-report | UA = 0-6 |
| (5) Simulation | UA = 0-3 |

Helping Others. When working with others, helps them to identify individual performance strengths and weaknesses; helps them to improve performance. Willingness to provide assistance as needed and to guides and tutor others on technical matters.

Assessment methods in order of UA:

- | | |
|------------------------|-----------|
| (1) Simulation | UA = 8-10 |
| (2) Live action | UA = 6-10 |
| (3) Self-report | UA = 4-7 |
| (4) Interviews | UA = 5-6 |
| (5) Real life behavior | UA = 0-6 |

Task Leadership. Ability to help keep the team focused on the team's assignment or mission, working with team members to react to changes and to ensure that conflicts do not hinder mission achievement.

Assessment methods in order of UA:

- | | |
|------------------------|------------|
| (1) Live action | UA = 14-16 |
| (2) Real life behavior | UA = 7 |
| (3) Simulation | UA = 5-6 |
| (4) Self-report | UA = 5-6 |
| (5) Interviews | UA = 5 |